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TRANSMITTAL LETTER

APPEAL BRIEF

Applicant : Bogdan C. Maglich
App. No : 09/883,851
Filed : June 18, 2001
For : METHOD AND APPARATUS FOR
NEUTRON MICROSCOPY WITH
STOICHIOMETRIC IMAGING
Examiner : Daniel Lawson Greene
Art Unit : 3663

CERTIFICATE OF MAILING

I hereby certify that this correspondence and all marked attachments are being deposited with the United States Postal Service as first-class mail in an envelope addressed to: Mail Stop Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on

March 10, 2006

(Date)

Bruce S. Itchkawitz, Reg. No. 47,677

Mail Stop Appeal Brief - Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Transmitted herewith for filing in the above-identified application are the following enclosures:

- (X) An Appeal Brief in twenty-seven (27) pages; and
- (X) A return prepaid postcard.

FILING FEES:

FEE CALCULATION				
FEE TYPE		FEE CODE	CALCULATION	TOTAL
Appeal Brief	41.20(b)(2)	1402 (\$500)		\$500
1 Month Extension	1.17(a)(1)	1251 (\$120)		N/A
2 Month Extension	1.17(a)(2)	1252 (\$450)		N/A
3 Month Extension	1.17(a)(3)	1253 (\$1,020)		N/A
			TOTAL FEE DUE	\$500

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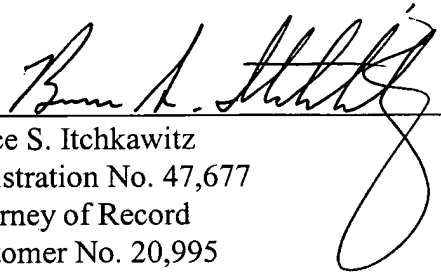
Application No. : 09/883,851

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Dated: March 10, 2006



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APPEAL BRIEF

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Mail Stop Appeal Brief-Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Dear Sir:

Applicant (Appellant) is appealing the rejection of Claims 1-17 of the present application as stated in the Final Office Action mailed on August 19, 2005 and as reaffirmed in the Advisory Action mailed on December 5, 2005. The rejected claims were also previously rejected in the Office Action mailed on November 4, 2004.

Pursuant to 37 C.F.R. § 41.37, this Appeal Brief is being filed within two months from the date of filing the Notice of Appeal on January 12, 2006. Enclosed with this Appeal Brief is the fee set forth in 37 C.F.R. § 41.20(b)(2). Please charge any additional fees, including any fees for additional extensions of time, or credit overpayment to Deposit Account No. 11-1410.

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I. REAL PARTY IN INTEREST

The real party in interest of the present application is HiEnergy Technologies, Inc.

II. RELATED APPEALS AND INTERFERENCES

Pursuant to 37 C.F.R. § 41.37(c)(1)(ii), Appellant hereby notifies the Board of Patent Appeals of the copending appeal of U.S. Patent Application No. 09/788,736, from which the application of the present appeal is a continuation-in-part. By providing this notification, Appellant seeks to satisfy the requirements of 37 C.F.R. § 41.37(c)(1)(ii) by identifying all prior and pending appeals, judicial proceedings or interferences known to Appellant which may be related to, may directly affect or may be directly affected by, or may have a bearing on the Board's decision in the pending appeal.

Appellant, the Appellant's Legal Representative, and the Assignee do not know of any other prior or pending appeals, interferences, or judicial proceedings which may be related to, directly affect or be directly affected by or have any bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-17 are currently pending as originally filed, and Claims 18-25 were previously cancelled without prejudice, and Claims 26-30 are cancelled herein without prejudice. A copy of the claims is attached hereto as an appendix. All of the currently pending claims were finally rejected by the Examiner in the August 17, 2005 Final Office Action. Rejected Claims 1-17 are the subject of this appeal.

IV. STATUS OF AMENDMENTS

Appellant proposed amending the pending claims in the "Response to August 17, 2005 Final Office Action," filed November 18, 2005, by adding Claims 26-30. In the December 5, 2005 Advisory Action, the Examiner indicated by marking boxes 3 and 3(a)-(d) on Form PTOL-303 that these proposed amendments would not be entered because they raised new issues that would require further consideration and/or search, they raised the issue of new matter, they were deemed to not place the application in better form for appeal by materially reducing or

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simplifying the issues for appeal, and they presented additional claims without canceling a corresponding number of finally rejected claims. However, the Examiner also indicated in the December 5, 2005 Advisory Action that the status of the claims would be that Claims 1-17 and 26-30 are rejected. To remove any confusion regarding the status of Claims 26-30, Appellant hereby cancels Claims 26-30 without prejudice. Therefore, it is Appellant's understanding that Claims 1-17 are currently pending as presented in the "Amendment and Response to August 19, 2005 Final Office Action."

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates to the field of non-invasive detection, imaging and stoichiometric analysis of inaccessible minute or microscopic quantities of chemical compounds and elements, and of mechanical structures and flaws inside materials, using subatomic particle activation.

One aspect of the present invention is a system for non-invasive stoichiometric detection and imaging of chemical elements and compounds in a material 800 to be analyzed. The system comprises a particle generator 830 which generates a plurality of first subatomic particles and a plurality of second subatomic particles 840 at a target position which is a first distance (L_1 in Figure 18 of the present application) from the material 800 to be analyzed (*see, e.g.*, Figure 18 and page 25, lines 1-12 of the present application). The system further comprises at least one photon detector 880 (*see, e.g.*, Figure 18 and page 25, lines 6-7 of the present application) capable of detecting photons resulting from irradiation of the material 800 to be analyzed by the first subatomic particles and generating a plurality of first electrical signals. The system further comprises a particle detector array 860 comprising a plurality of particle detectors (*see, e.g.*, Figure 18 and page 25, lines 3-4 of the present application). The detector array 860 is at a second distance (L_2 in Figure 18 of the present application) from the target position, the second distance being larger than the first distance (*see, e.g.*, page 23, lines 26-30 and page 24, line 28 – page 25, line 14). The particle detectors are each capable of detecting at least one second subatomic particle 840 from the particle generator 830 and generating a plurality of second electrical signals. The system further comprises an analyzer 39 operatively connected to the particle

detector array 860 and the at least one photon detector 880. The analyzer 39 comprises a processor 33 that filters the plurality of first electrical signals so as to produce a plurality of filtered electrical signals (*see, e.g.*, Figure 8, page 13, lines 10-23, and page 15, lines 14-17 of the present application). The analyzer 39 further comprises a plurality of electronic coincidence circuits that detect coincidences occurring between the plurality of filtered electrical signals and the plurality of second electrical signals (*see, e.g.*, page 13, line 10 – page 16, line 7 of the present application). Reference numbers are to the present application unless indicated otherwise.

Another aspect of the present invention is a system for detecting and imaging a chemical substance 800. The system comprises a particle source 830 generating a plurality of first subatomic particles and a plurality of second subatomic particles 840 from a target position a first distance (L_1 in Figure 18 of the present application). The first subatomic particles irradiate the chemical substance 800 (*see, e.g.*, page 25, lines 4-5 of the present application). The system further comprises at least one photon detector 880 (*see, e.g.*, Figure 18 and page 25, lines 6-7 of the present application) capable of detecting photons resulting from the irradiation of the chemical substance 800 by the first subatomic particles. The system further comprises a particle detector array 860 comprising a plurality of particle detectors (*see, e.g.*, Figure 18 and page 25, lines 3-4 of the present application). The particle detector array 860 is capable of detecting at least one second subatomic particle 840. The particle detector array 860 is at a second distance (L_2 in Figure 18 of the present application) from the target position, and the second distance is larger than the first distance. The system further comprises an analyzer capable of detecting and imaging the chemical substance based on signals output from the at least one photon detector and the at least one particle detector (*see, e.g.*, Figure 8, page 13, lines 10-23, and page 15, lines 14-17 of the present application). Reference numbers are to the present application unless indicated otherwise.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A) Whether independent Claims 1 and 5 and dependent Claims 2-4 and 6-17 are unpatentable under 35 U.S.C. § 102(b) as being anticipated by the May 1998 publication “Associated Particle Imaging (API),” from Bechtel Nevada (“the Bechtel reference”).

B) Whether independent Claims 1 and 5 and dependent Claims 2-4 and 6-17 are unpatentable under 35 U.S.C. § 102(f) because Appellant did not invent the claimed subject matter.

C) Whether independent Claims 1 and 5 and dependent Claims 2-4 and 6-17 are directed to a non-elected species.

VII. ARGUMENT

Rejection under 35 U.S.C. § 102(b) for anticipation

Appellant submits that each of Claims 1-17 includes limitations which are not disclosed by the May 1998 publication, “Associated Particle Imaging (API),” from Bechtel Nevada (“the Bechtel reference”) so each of these claims satisfies the requirement of novelty under 35 U.S.C. § 102(b).

The essential inquiry for anticipation is whether “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987); *see, also*, M.P.E.P. §2131.

Claim 1

As pending, Claim 1 recites (emphasis added):

1. A system for non-invasive stoichiometric detection and imaging of chemical elements and compounds in a material to be analyzed, the system comprising:

a particle generator, **the particle generator generating a plurality of first subatomic particles and a plurality of second subatomic particles at a target position which is a first distance from the material to be analyzed;**

at least one photon detector, the at least one photon detector being capable of detecting photons resulting from irradiation of the material to

be analyzed by the first subatomic particles and generating a plurality of first electrical signals;

a particle detector array comprising a plurality of particle detectors, **the detector array at a second distance from the target position, the second distance being larger than the first distance**, the particle detectors each being capable of detecting at least one second subatomic particle from the particle generator, and generating a plurality of second electrical signals; and

an analyzer operatively connected to the particle detector array and the at least one photon detector, comprising:

a processor, the processor filtering the plurality of first electrical signals so as to produce a plurality of filtered electrical signals; and

a plurality of electronic coincidence circuits, the coincidence circuits detecting coincidences occurring between the plurality of filtered electrical signals and the plurality of second electrical signals.

Appellant submits that the Bechtel reference does not disclose “a particle generator ... generating a plurality of first subatomic particles and a plurality of second subatomic particles at a target position which is a first distance from the material to be analyzed” and “a particle detector array ... at a second distance from the target position, the second distance being larger than the first distance” as recited by Claim 1.

As disclosed by the present application, in certain embodiments, neutron/alpha particle pairs are created at a target, with the neutron and the alpha particle of each pair traveling in opposite directions (*see, e.g.*, page 8, lines 2-7). The material to be analyzed is positioned at one side of the target at a first distance from the target, and an alpha particle detector array is positioned at the other side of the target at a second distance from the target, with the second distance larger than the first distance (*see, e.g.*, Figure 18 and page 25, lines 1-12). At least some of the neutrons irradiate and interact with atomic nuclei of the material to be analyzed, thereby creating gamma rays with energies which identify the atomic elements of the material to be analyzed (*see, e.g.*, page 8, lines 17-23). Alpha particles corresponding to the neutrons which irradiate the material are detected by the alpha particle detector array (*see, e.g.*, page 8, lines 26-30). Each of the detector elements of the alpha particle detector array subtends a corresponding solid angle with respect to the target, so by using the substantially co-linear relationship between

the neutron and the alpha particle of each neutron/alpha particle pair, the alpha particle detector array can be used for imaging purposes to determine the locations from which the detected gamma rays are generated within the material to be analyzed (*see, e.g.*, page 10, lines 12-22). By having the alpha particles travel a farther distance to the alpha particle detector array than the distance traveled by the neutron to the material to be analyzed, magnification is advantageously accomplished (*see, e.g.*, Figure 18 and page 24, line 28 – page 25, line 22).

In the August 19, 2005 Final Office Action, the Examiner's asserts that the Bechtel reference discloses all the limitations of Claim 1. In particular, at the bottom of page 3 of the August 19, 2005 Final Office Action, the Examiner states that the Bechtel reference discloses that:

the detector array [is] at a second distance from the target position (*see, for example, Figure 1 on page 2 wherein the position-sensitive PMT is clearly further away from the material to be analyzed than the tritiated target, etc*), the second distance being larger than the first distance.

Applicant submits that this statement, and hence the rejection of Claim 1, is based on a misinterpretation of the claims, particularly the definition of the "second distance." As shown in this quoted language, the Examiner has confused "the material to be analyzed" with the "target position" as recited by Claim 1 by misinterpreting the distance between the detector array and the material to be analyzed as being the second distance. As recited by Claim 1, the target position is a first distance from the material being analyzed and the particle detector array is a second distance from the target position. Claim 1 further recites that the second distance is **larger** than the first distance (*see, e.g.*, Figure 18 of the present application). At page 23, line 26 - page 25, line 22, the present application describes how the second distance (between the target position and the particle detector array) being **larger** than the first distance (between the target position and the material being analyzed) advantageously provides a magnification effect.

Appellant submits that the Bechtel reference does not disclose such a system as recited by Claim 1 of the present application. For example, Figures 1 and 8 of the Bechtel reference disclose a system in which the second distance (between the target position and the particle detector array) is **smaller** than the first distance (between the target position and the material

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being analyzed). Thus, the Bechtel reference does not disclose the relative distances as recited by Claim 1 of the present application.

In the December 5, 2005 Advisory Action, the Examiner states that:

it appears applicant's arguments are directed towards the intended use of the apparatus as the Bechtel references [sic] is inherently [sic] capable of being placed directly on top of the target material so that the distances mirror those claimed.

Appellant submits that this passage expresses a misinterpretation of the Bechtel reference and a misapplication of the concept of inherency and the concept of intended use to the claims of the present application.

Contrary to the Examiner's assertion, the structure disclosed by the Bechtel reference can not satisfy the structure recited by Claim 1 of the present application by being "placed directly on top of the target material." Appellant notes that, as discussed above with regard to the Examiner's statement from the August 19, 2005 Final Office Action, this passage again confuses the "material to be analyzed" with the "target position" recited by Claim 1. Presumably, this passage is meant to state that the target can be placed on the material to be analyzed so that the distance between the alpha particle detector and the target is larger than the distance between the material to be analyzed and the target. However, Figure 8 of the Bechtel reference shows that this configuration is not possible. In Figure 8 of the Bechtel reference, the PSPMT (position-sensitive PMT) is adjacent to the STNG (sealed tube neutron generator) at the center of a 3-ft.-by-3-ft. mass of high-density polyethylene shielding. The test object shown in this figure can not be placed closer to the source of neutrons (*i.e.*, the STNG) than is the alpha particle detector array (*i.e.*, the PSPMT). Therefore, the structure disclosed by the Bechtel reference is not "inherently capable of being placed ... so that the distances mirror those claimed," as asserted by the Examiner.

Appellant further submits that even if the structure disclosed by the Bechtel reference were able to be positioned as the Examiner asserts, the Bechtel reference would not inherently anticipate the structure recited by Claim 1. Pursuant to M.P.E.P. § 2112(IV) (Rev. 3, August 2005, page 2100-57), "[t]he fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic" (emphasis

in original; citing *In re Rijckaert*, 9 F.3d 1531, 1534, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981)). The mere fact that a certain thing may result from a given set of circumstances is not sufficient. "Inherency may not be established by probabilities or possibilities." *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999). To establish inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)(emphasis in original).

Appellant submits that by explicitly illustrating a configuration in which the test object is farther from the neutron source than is the alpha particle detector array, the Bechtel reference shows that the system disclosed by the Bechtel reference does not necessarily have the structure recited by Claim 1. Thus, the Examiner has not satisfied his burden to show that the Bechtel reference inherently discloses the structure recited by Claim 1. Therefore, Appellant submits that Claim 1 is not anticipated by the Bechtel reference.

Appellant further submits that the concept of intended use is irrelevant to the patentability of Claim 1. It is proper to use functional language to define the claimed invention "by what it does rather than by what it is." *In re Swinehart*, 439 F.2d 210, 212, 169 U.S.P.Q. 226 (C.C.P.A. 1971). In fact, the use of such functional language may be a practical necessity to define the claimed invention. *Id.* A functional limitation is evaluated and considered for what it fairly conveys to a person of ordinary skill in the art in the context in which it is used. M.P.E.P. § 2173.05(g). However, functional language which recites the intended use of the claimed apparatus does not differentiate the claimed apparatus from a prior art apparatus "if the prior art apparatus teaches all the **structural** limitations of the claim." *Ex parte Masham*, 2 U.S.P.Q.2d 1647 (Bd. Pat. App. & Inter. 1987)(emphasis in original). Furthermore, "[e]ven if the prior art device performs all the functions recited in the claim, **the prior art cannot anticipate the claims if there is any structural difference.**" M.P.E.P. § 2114 (emphasis added). Thus, if the claim language structurally distinguishes the claimed apparatus from the prior art apparatus, then the claimed apparatus is not anticipated by the prior art apparatus.

As discussed above, Appellant submits that the Bechtel reference does not disclose the relative distances between the particle generator and the target position, and between the material to be analyzed and the target position as recited by Claim 1. Therefore, there are structural differences between the Bechtel reference and the structure recited by Claim 1, so the Bechtel reference does not anticipate Claim 1.

For at least the foregoing reasons, Appellant submits that Claim 1 includes limitations which are not disclosed by the Bechtel reference, so Claim 1 is patentably distinguished over the Bechtel reference.

Claims 2-4

Each of Claims 2-4 depends from Claim 1. Therefore, for at least the reasons stated above with regard to Claim 1, Appellant submits that each of Claims 2-4 is patentably distinguished over the Bechtel reference.

Claim 5

As pending, Claim 5 recites (emphasis added):

5. A system for detecting and imaging a chemical substance, comprising:

a particle source, the source generating a plurality of first subatomic particles and a plurality of second subatomic particles from **a target position a first distance from the chemical substance**, the first subatomic particles irradiating the chemical substance;

at least one photon detector capable of detecting photons resulting from the irradiation of the chemical substance by the first subatomic particles;

a particle detector array comprising a plurality of particle detectors, the particle detector array capable of detecting at least one second subatomic particle, **the particle detector array at a second distance from the target position, the second distance larger than the first distance**; and

an analyzer capable of detecting and imaging the chemical substance based on signals output from the at least one photon detector and the at least one particle detector.

As discussed above in relation to Claim 1, Appellant submits that the Bechtel reference does not disclose all the limitations of Claim 5. For example, the Bechtel reference does not disclose a second distance (between the target position and the particle detector array) which is larger than

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the first distance (between the target position and the chemical substance), as recited by Claim 5. Therefore, for at least the reasons stated above with regard to Claim 1, Appellant submits that Claim 5 is patentably distinguished over the Bechtel reference.

Claims 6-17

Each of Claims 6, 7, 10, and 12-14 depends from Claim 5, each of Claims 8 and 9 depends from Claim 7, Claim 11 depends from Claim 10, each of Claims 15 and 16 depends from Claim 14, and Claim 17 depends from Claim 16. Therefore, for at least the reasons stated above with regard to Claim 5, Appellant submits that each of Claims 6-17 is patentably distinguished over the Bechtel reference.

Rejection under 35 U.S.C. § 102(f) for lack of inventorship

Appellant submits that Appellant, Dr. Bogdan C. Maglich, is the sole true inventor of the claimed subject matter recited by Claims 1-17 in accordance with 35 U.S.C. § 102(f).

Discussion of entry of "Declaration of Bogdan C. Maglich, Ph.D."

On November 18, 2005, Appellant submitted a "Declaration of Bogdan C. Maglich, Ph.D. Pursuant to 37 C.F.R. § 1.132" ("Dr. Maglich's Declaration" or "the Declaration") by mailing the Declaration along with the "Response to August 19, 2005 Final Office Action." However, the December 5, 2005 Advisory Action is silent regarding whether this Declaration was entered into the file history. As discussed below, Appellant respectfully requests that the Board direct the Examiner to enter the Declaration and consider the Declaration.

Pursuant to 37 C.F.R. § 1.116(e), "an affidavit or other evidence submitted after a final rejection or other final action ... but before or on the same date of filing an appeal ... may be admitted upon a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented." Furthermore, pursuant to M.P.E.P. § 716.01, declarations under 37 C.F.R. § 1.132 traversing rejections, when timely presented, must be considered by the Examiner whenever present.

On November 18, 2005, Appellant submitted the Declaration by mailing the Declaration along with the "Response to August 19, 2005 Final Office Action." The filing date of the Notice of Appeal for the present application was January 12, 2006. Thus, Appellant submits that the Declaration is "an affidavit or other evidence submitted after a final rejection ... but before or on

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the same date of filing an appeal” as defined by 37 C.F.R. § 1.116. Therefore, pursuant to 37 C.F.R. § 1.116, Appellant submits that the Declaration may be admitted upon a showing of good and sufficient reasons why the Declaration is necessary and was not earlier presented.

Appellant further submits the following showing of good and sufficient reasons why the Declaration is necessary and was not presented earlier. Pursuant to M.P.E.P. § 2137, the Declaration is necessary because “it is incumbent upon the inventors named in the application, in reply to an inquiry regarding the appropriate inventorship under subsection (f), ... to provide a satisfactory showing by way of affidavit under 37 C.F.R. § 1.132 that the inventorship of the application is correct.” In addition, the Declaration is necessary to provide further factual support for the arguments presented below. Appellant further submits that the Declaration was not earlier presented because the Examiner first raised the issue of inventorship in the August 19, 2005 Final Office Action. Thus, the first opportunity for Appellant to submit the Declaration was when it was filed, *i.e.*, with the “Response to August 19, 2005 Final Office Action.” Therefore, pursuant to 37 C.F.R. § 1.116, Appellant respectfully requests that the Board direct the Examiner to enter the Declaration. Furthermore, pursuant to M.P.E.P. § 716.01, Appellant respectfully requests that the Board direct the Examiner to consider the Declaration.

Discussion of Dr. Maglich’s sole inventorship of the claimed invention

Under 35 U.S.C. § 102(f), a person shall be entitled to a patent unless “he did not himself invent the subject matter sought to be patented.” Therefore, in order to reject a claim under § 102(f), the Examiner must show that Appellant did not invent the claimed subject matter of the claim. As explained in M.P.E.P. § 2137.01(II) (Rev. 2, May 2004), inventorship is defined by the person or persons who conceived of the invention. Insofar as defining an inventor is concerned, reduction to practice, *per se*, is irrelevant. Furthermore, as long as the inventor maintains intellectual domination over making the invention, the inventor may consider and adopt ideas, suggestions, and materials from others (M.P.E.P. §§ 2137.01(III), 2138.04).

Pursuant to M.P.E.P. § 2137.01(I), “[t]he party or parties executing an oath or declaration under 37 C.F.R. § 1.63 are presumed to be the inventors.” Furthermore, statements in a patent application (such as the inventor declaration) as to sole inventorship are *prima facie* evidence of such sole inventorship, so a party relying on his application does not have to prove such facts,

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and a party who wishes to dispute sole inventorship as stated in an application has the burden of overcoming the *prima facie* effect of the application. See, *Fritsch v. Lin*, 21 U.S.P.Q.2d 1737, 1739 (B.P.A.I. 1991). Therefore, the inventor declaration executed solely by Dr. Maglich and submitted on November 19, 2003 regarding the present application is *prima facie* evidence of Dr. Maglich's sole inventorship of the claimed invention of the present application.

As outlined below, Applicant submits that the assumptions made by the Examiner and the references raised by the Examiner do not overcome this *prima facie* evidence of Dr. Maglich's sole inventorship. Therefore, the Examiner has not met his burden for a rejection under 35 U.S.C. § 102(f).

1. The HIET article

The Examiner cites the article "*HiEnergy Technologies, Inc. (HIET) company interview*," The Wall Street Transcript, April 4, 2005 ("the HIET article") as stating that Dr. Maglich "clearly admits that he is not the sole inventor of the claimed subject matter." The HIET article does not include any statements explicitly addressing the inventorship of the claimed invention of the present application. However, the Examiner makes numerous assumptions in interpreting the HIET article to presumably show that Dr. Maglich is not the true, sole inventor of the claimed invention of the present application. Appellant submits that the Examiner's mere assumptions regarding inventorship do not satisfy his burden to overcome the *prima facie* evidence of Dr. Maglich's sole inventorship.

In addition, Appellant submits that the Examiner's assumptions are incorrect and are irrelevant. The HIET article refers to Appellant's activities and collaborations to reduce to practice, to show "proof of concept," and to commercialize other inventions (e.g., stoichiometric detection of landmines) which do not include the claimed invention recited by Claims 1-17 of the present application. Therefore, Appellant submits that the HIET article is irrelevant to the issue of Dr. Maglich's inventorship of the pending claims of the present application, and certainly is not an admission regarding Dr. Maglich's inventorship of the pending claims of the present application.

The Examiner's assumptions appears to place great importance to the HIET article quoting Dr. Maglich as stating that his company in 1997 had "essentially just three scientists"

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and as stating that “we were able to show to the government what would be a chemist’s dream.” However, Appellant submits that Dr. Maglich’s acknowledgment that his company initially had two other scientists and his use of the pronoun “we” are both incorrect and irrelevant to the question of inventorship, and that these assumptions do not alter the fact that Dr. Maglich is the true, sole inventor of the claimed invention of the present application.

With regard to Dr. Maglich’s use of the word “we,” the HIET article acknowledges the contributions of all individuals who participated in his experiments or other activities, regardless of whether their activities contributed to the conception of any inventions. Therefore, the mere fact that Dr. Maglich used the word “we” in the HIET article to acknowledge that other scientists were involved in the development of a stoichiometric detector of landmines is insufficient to assume that these other individuals contributed to the conception of the claimed invention recited by the pending claims of the present application.

With regard to the activities of the other two scientists, the HIET article merely refers to Appellant’s reduction to practice, “proof of concept,” and commercialization activities with regard to a system for stoichiometric detection of landmines. These activities included specific measurements which were assigned to the other two scientists by Dr. Maglich and which were performed under Dr. Maglich’s direction and control. Pursuant to M.P.E.P. §§ 2137.01(II), (III), and 2138.04, these measurements assigned by Dr. Maglich and performed under Dr. Maglich’s direction and control are irrelevant to the question of inventorship. In addition, even assuming for the sake of argument that Dr. Maglich received ideas or suggestions regarding the claimed invention of the present application from the two other scientists, these ideas or suggestions were made under the intellectual domination of Dr. Maglich, so they would not alter the fact of Dr. Maglich’s sole conception and inventorship of the claimed invention of the present application. Therefore, these activities do not amount to inventive activity by the two other scientists which would overcome the *prima facie* evidence of Dr. Maglich’s sole inventorship of the claimed invention of the present application.

The Examiner’s assumptions further appear to place great importance to portions of the HIET article which refer to collaborations with various other entities. However, the Examiner’s assumption regarding inventorship is incorrect. These collaborations are both irrelevant to the

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question of inventorship and do not alter the fact that Dr. Maglich is the true, sole inventor of the claimed invention of the present application.

The collaboration of Dr. Maglich with these other entities was directed towards “proof of concept” activities such as reduction to practice and commercialization with regard to a system for stoichiometric detection of landmines. These collaborations were performed under two agreements between Dr. Maglich’s company and U.S. Government entities under which the role of these other entities was limited to providing funding, equipment, and/or performing specific measurements specified by Dr. Maglich and conducted by others under Dr. Maglich’s direction and control.

Under both of these agreements with U.S. Government entities, (i) Dr. Maglich’s company was obligated to report to the U.S. Government any Subject Inventions (*i.e.*, inventions conceived of or first reduced to practice under the agreements) in order to retain title to these inventions, and (ii) the other participants were obligated to report and disclose to Dr. Maglich’s company any Subject Inventions made under the respective agreements. In fact, no such reports of inventions made under the agreements were submitted to the U.S. Government by Dr. Maglich’s company or to Dr. Maglich’s company by the other participants. This lack of reports regarding such inventions is proof that there were no such inventions conceived of or first reduced to practice by the participants under either of these agreements. In particular, since the other participants (*e.g.*, personnel performing the measurements) did not make any reports of such inventions, these participants acknowledge that they did not make any contributions to the conception of an invention. Therefore, any such contributions are irrelevant to the question of inventorship and do not alter the fact of Dr. Maglich’s sole conception and inventorship of the claimed invention of the present application.

Pursuant to M.P.E.P. §§ 2137.01(II), (III), and 2138.04, the measurements specified by Dr. Maglich and performed by others under Dr. Maglich’s direction and control are irrelevant to the question of inventorship. In addition, even assuming for the sake of argument that Dr. Maglich received ideas or suggestions regarding the claimed invention of the present application from other participants, these ideas or suggestions were made under the intellectual domination of Dr. Maglich, so they would not alter the fact of Dr. Maglich’s sole conception and

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inventorship of the claimed invention of the present application. Therefore, these activities do not amount to inventive activity by others which would satisfy the Examiner's burden to overcome the *prima facie* evidence of Dr. Maglich's sole inventorship of the claimed invention of the present application.

For at least the above-stated reasons, Appellant submits that the HIET article does not satisfy the Examiner's burden to overcome the *prima facie* evidence of Dr. Maglich's sole inventorship of the claimed invention recited by the pending claims of the present application.

2. The Bechtel and Hurley references

The Examiner also cites the Bechtel reference and "*Current Status of the Associated Particle Imaging System at STL*," J.P. Hurley *et al.*, January 10, 1992 ("the Hurley reference") as clearly showing that at least Mr. Hurley and associates were also working for several years in conjunction with the same organizations. However, Appellant submits that neither the Bechtel reference nor the Hurley reference discloses the claimed invention of the present application. For example, neither reference discloses or suggests structure having the second distance (*e.g.*, the distance between the alpha particle detector array and the target) farther than the first distance (*e.g.*, the distance between the material to be analyzed and the target). Furthermore, configurations such as those disclosed by the Bechtel reference and the Hurley reference cannot provide a magnification effect, and are silent regarding the possibility or desirability of such a magnification effect. Therefore, the Bechtel reference is not relevant to the question of inventorship of the claimed invention of the present application. Additionally, not only is the Hurley reference not a proper reference for anticipation under 35 U.S.C. § 102(b) (which the Examiner presumably recognizes since the Examiner did not make such a rejection), but the Hurley reference is also not relevant to the question of inventorship of the claimed invention of the present application.

It is pure conjecture by the Examiner to make the leap of logic that Dr. Maglich is not the true, sole inventor of the claimed invention merely because "Mr. Hurley and associates" had worked "in conjunction with the same organizations" as had Dr. Maglich at one time. Such broad statements without additional proof of the contributions of others to the conception of the

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claimed invention do not satisfy the Examiner's burden to overcome the *prima facie* evidence of Dr. Maglich's sole inventorship of the claimed invention of the present application.

3. The Beyerle reference

The Examiner also cites A. Beyerle *et al.*, "*Design of an associated particle imaging system*," Nuclear Instruments and Methods in Physics Research, Volume A299, 1990, pages 458-462 ("the Beyerle reference") as being a disclosure by three other scientists of "what appears to be a seemingly identical system as the instant invent[ion] only in its infant stage." Appellant submits that the Beyerle reference does not disclose or suggest all the limitations of the pending claims. For example, the Beyerle reference does not disclose or suggest structure having the second distance (*e.g.*, the distance between the alpha particle detector array and the target) farther than the first distance (*e.g.*, the distance between the material to be analyzed and the target). Thus, contrary to the Examiner's assertion that the Beyerle reference reports "a seemingly identical system as the instant invention," the Beyerle reference does not disclose or suggest all the limitations of the claimed invention of the present application. Therefore, not only is the Beyerle reference not a proper reference for anticipation under 35 U.S.C. § 102(b) (which the Examiner presumably recognizes since the Examiner did not make such a rejection), but the Beyerle reference is also not relevant to the question of inventorship of the claimed invention of the present application. The Beyerle reference does not satisfy the Examiner's burden to overcome the *prima facie* evidence of Dr. Maglich's sole inventorship of the claimed invention of the present application.

4. Other non-patent literature

The Examiner further cites "all of the non-patent literature listed on the attached PTO-892" as disclosing that several other scientists were working "on the project," that nowhere do these documents mentioned Dr. Maglich, and that the present application does not list these other scientists as co-inventors.

Appellant submits that the claimed invention of the present invention is not disclosed or suggested, either alone or in combination with one another, by the patents and non-patent literature listed on the Form PTO-892 which was attached to the August 17, 2005 Final Office Action. Thus, none of these references, either alone or in combination with one another,

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discloses or suggests all the limitations of the claimed invention of the present application (which the Examiner presumably recognizes since the Examiner did not make any such rejections). Therefore, all of these references are irrelevant to the question of inventorship of the claimed invention of the present application.

Furthermore, pursuant to M.P.E.P. § 2137:

Where there is a published article identifying the authorship ... **the designation of authorship ... does not raise a presumption of inventorship** with respect to the subject matter disclosed in the article ... **so as to justify a rejection under 35 U.S.C. 102(f).**

Thus, even if the non-patent literature cited by the Examiner were relevant to the claimed invention, the authors and coauthors of the non-patent literature listed on the Form PTO-892 may not be presumed to be co-inventors of the claimed invention of the present application. Therefore, the authorship of the non-patent literature cited by the Examiner does not raise a presumption of inventorship of the pending claims of the present application and does not satisfy the Examiner's burden to overcome the *prima facie* evidence of Dr. Maglich's sole inventorship to justify a rejection under 35 U.S.C. § 102(f).

Question regarding whether Claims 1-17 are directed to an elected species

In the "December 5, 2005 Advisory Action," the Examiner asserts that "For applicant's benefit it appears that applicant's arguments are directed to a non-elected species, i.e. figure 18, (See the 4/15/2006 [sic] response to the requirement for restriction)."

Appellant submits that a review of the prosecution history shows that this assertion by the Examiner incorrectly states the current status of the elected species. In a Restriction Requirement mailed January 16, 2003, the Examiner required restriction to one of two groups of claims: Group I corresponding to apparatus Claims 1-17, and Group II corresponding to method Claims 16-25. In addition, the Examiner required election to one of the following species for prosecution on the merits: (A) the embodiment of Figures 1-3; (B) the embodiment of Figure 4; (C) the embodiment of Figure 5; (D) the embodiment of Figure 6; and (E) the embodiment of Figure 7. In the "Response to Restriction Requirement" mailed April 11, 2003, Appellant responded to the restriction requirement by electing without traverse to prosecute the claims directed to Group I, Species A which Appellant stated corresponded to Claims 1-17. Appellant

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notes that the restriction requirement did not address any of the other figures of the present application. In particular, the restriction requirement did not state that Figure 18 corresponded to a separate species of which election was required.

After the first Office Action mailed May 28, 2003 and Appellant's "Amendment and Response to May 28, 2003 Office Action," the Examiner issued the Final Office Action mailed December 23, 2003. In this Final Office Action, the Examiner stated that "if applicant is arguing his inventive novelty to be the distance between the target and the particle detector (i.e., second distance) as being greater than the distance between the target and the substance analyzed (i.e., first distance) applicant's arguments are to a non-elected embodiment." During the Personal Interview conducted on January 12, 2004 between Examiner Jack Keith and Appellant's representatives, Dr. Bruce S. Itchkawitz and Dr. Mu Young Lee, Dr. Itchkawitz explained that the restriction requirement did not specify any distinction between the embodiments of Figure 18 and those of Species A which would make the embodiment of Figure 18 a non-elected species if Species A were elected. The Examiner acknowledged that he had missed seeing Figure 18 so that it was not included in the restriction requirement. The Examiner further stated that he would allow Figure 18 as an elected embodiment. Applicant's representative identified Claims 1-17 as being readable on the embodiment of Figure 18.

This status of the elected species as corresponding to the embodiment of Figure 18 was confirmed by the Examiner in the Interview Summary prepared during the Personal Interview and in the Office Action mailed May 28, 2004. In addition, prosecution of Claims 1-17 continued with the Office Action mailed November 4, 2004, the Personal Interview conducted on February 9, 2005 between Examiner Jack Keith, Appellant's representative Dr. Bruce S. Itchkawitz, and Appellant, Dr. Bogdan C. Maglich, and the Final Office Action mailed August 19, 2005. Throughout this portion of the prosecution history, the Examiner never indicated that arguments directed to embodiments of Figure 18 were directed to a non-elected species.

Only now in the December 5, 2005 Advisory Action, the Examiner indicates that arguments directed to embodiments of Figure 18 are to a non-elected species. However, this assertion is contrary to the explicit previous statements by the Examiner recorded multiple times in the prosecution history. Appellant submits that this assertion incorrectly states the current

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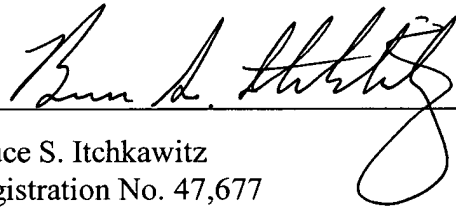
status of the elected species and respectfully requests that the Board acknowledge that Claims 1-17, corresponding to the embodiment of Figure 18, are directed to the elected species of the present application.

Conclusion

In view of the foregoing, Appellant respectfully submits that the rejections of Claims 1-17 are not well founded. Appellant therefore respectfully requests that the Board reverse the rejection of Claims 1-17.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

A handwritten signature in black ink, appearing to read "Bruce S. Itchkawitz", is written over a horizontal line.

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VIII. CLAIMS APPENDIX

1. (Rejected) A system for non-invasive stoichiometric detection and imaging of chemical elements and compounds in a material to be analyzed, the system comprising:

a particle generator, the particle generator generating a plurality of first subatomic particles and a plurality of second subatomic particles at a target position which is a first distance from the material to be analyzed;

at least one photon detector, the at least one photon detector being capable of detecting photons resulting from irradiation of the material to be analyzed by the first subatomic particles and generating a plurality of first electrical signals;

a particle detector array comprising a plurality of particle detectors, the detector array at a second distance from the target position, the second distance being larger than the first distance, the particle detectors each being capable of detecting at least one second subatomic particle from the particle generator, and generating a plurality of second electrical signals; and

an analyzer operatively connected to the particle detector array and the at least one photon detector, comprising:

a processor, the processor filtering the plurality of first electrical signals so as to produce a plurality of filtered electrical signals; and

a plurality of electronic coincidence circuits, the coincidence circuits detecting coincidences occurring between the plurality of filtered electrical signals and the plurality of second electrical signals.

2. (Rejected) The system of Claim 1, wherein the first subatomic particles comprise neutrons.

3. (Rejected) The system of Claim 1, wherein the second subatomic particles comprise alpha particles.

4. (Rejected) The system of Claim 1, wherein the particle detectors are electronically coordinated to produce a three dimensional electronic image of the material to be analyzed, the image corresponding to a plurality of imaged volume elements, whereby the image provides an average empirical chemical formula for each imaged volume element.

5. (Rejected) A system for detecting and imaging a chemical substance, comprising:

a particle source, the source generating a plurality of first subatomic particles and a plurality of second subatomic particles from a target position a first distance from the chemical substance, the first subatomic particles irradiating the chemical substance;

at least one photon detector capable of detecting photons resulting from the irradiation of the chemical substance by the first subatomic particles;

a particle detector array comprising a plurality of particle detectors, the particle detector array capable of detecting at least one second subatomic particle, the particle detector array at a second distance from the target position, the second distance larger than the first distance; and

an analyzer capable of detecting and imaging the chemical substance based on signals output from the at least one photon detector and the at least one particle detector.

6. (Rejected) The system of Claim 5, wherein the particle detectors are electronically coordinated to produce a three dimensional electronic image of the chemical

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substance, the image corresponding to a plurality of imaged volume elements, whereby the image provides an average empirical chemical formula for each imaged volume element.

7. (Rejected) The system of Claim 5, wherein the first subatomic particles comprise neutrons.

8. (Rejected) The system of Claim 7, wherein the neutrons have an energy level greater than or equal to 1 MeV.

9. (Rejected) The system of Claim 7, wherein the particle source comprises at least one target and at least one hydrogen isotope source which generates hydrogen isotopes, the particle source configured to impinge the hydrogen isotopes on the at least one target, thereby generating the neutrons.

10. (Rejected) The system of Claim 5, wherein the second subatomic particles comprise alpha particles.

11. (Rejected) The system of Claim 10, wherein the at least one photon detector and the at least one particle detector are adapted to provide information regarding the position of the chemical substance relative to the system.

12. (Rejected) The system of Claim 5, wherein the photon detector comprises a Germanium crystal detector capable of detecting gamma rays.

13. (Rejected) The system of Claim 5, wherein the plurality of particle detectors comprise at least one scintillation detector.

14. (Rejected) The system of Claim 5, wherein the analyzer is adapted to detect coincidences between the particle detector and the photon detector.

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15. (Rejected) The system of Claim 14, wherein the coincidences correspond to a plurality of spectral lines and the analyzer is further adapted to electronically process the detected coincidences to provide discrimination among the spectral lines.

16. (Rejected) The system of Claim 14, wherein the analyzer is further adapted to provide information regarding ratios of types of constituent atoms present in the chemical substance.

17. (Rejected) The system of Claim 16, wherein the types of constituent atoms include carbon, nitrogen, and oxygen.

18.-30. (Cancelled)

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IX. EVIDENCE APPENDIX

None.

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X. RELATED PROCEEDINGS APPENDIX

None.